

REMARKS

The application has been reviewed in light of the Office Action dated December 23, 2003. Claims 1-7 were pending in this application. By this Amendment, Applicants have added new dependent claims 8-15, and amended claims 2 and 3 to clarify the claimed invention. It is respectfully submitted that no new matter has been introduced, and entry of this Amendment is requested. Accordingly, claims 1-15 are presented for examination, with claims 1-3, 10 and 13 being in independent form.

Claims 1, 4 and 5 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 6,200,024 to Negrelli in view of U.S. Patent No. 6,309,102 to Stenfors. Claim 6 was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Negrelli in view of Stenfors and further in view of U.S. Patent No. 5,226,069 to Narita. Claims 2 and 3 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 4,501,011 to Hauck et al. in view of U.S. Patent No. 6,041,097 to Roos et al.

Applicants have carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claims 1-3 are patentable over the cited art, for at least the following reasons.

This application relates to systems for positioning a digital flat panel x-ray receptor for various diagnostic x-ray protocols for imaging various parts of the body. Digital x-ray sensors are quickly becoming the preferred x-ray recording medium. However, the cost of digital flat panel detectors presents an obstacle for conventional systems which have multiple digital flat panel detectors pre-mounted in the system to allow sensors to be available for each of the standard imaging protocols. Applicants devised a system for positioning a digital flat panel x-ray receptor which allows for a variety of diagnostic x-ray protocols to be performed.

For example, according to one embodiment (independent claim 1), a system for positioning a digital flat panel x-ray receptor for a variety of diagnostic x-ray protocols comprises at least one x-ray source, a digital flat panel x-ray receptor and an upwardly extending, floor-supported column. The floor-supported column supports the receptor for movement to different positions up and down along an upwardly extending axis, about the same or a different upwardly extending axis, and about a lateral axis transverse to the axis along which the receptor moves up and down. The receptor and the x-ray source are mounted on separate supports for movement independent of each other. The x-ray source and the receptor are juxtaposed for directing an x-ray beam from the x-ray source to an imaging face of the receptor for a variety of diagnostic x-ray protocols, including protocols in which the source is above the receptor and protocols for lateral imaging in which the source and receptor are at matching levels.

Negrelli, as understood by Applicants, is directed to a robotic support system, as a substitute for a C-arm support, for a radiographic imaging apparatus. The support system includes positioning systems for positioning an x-ray source and an x-ray detector, respectively, relative to an examination region.

As acknowledged in the Office Action, Negrelli does not disclose or suggest (a) an upwardly extending, floor-supported column which supports the receptor for movement to different positions up and down along an upwardly extending axis, about the same or a different upwardly extending axis, and (b) means for positioning the digital flat panel x-ray receptor for a variety of diagnostic x-ray protocols that includes protocols in which the source is above the receptor and protocols for lateral imaging in which the source and receptor are at matching levels.

Stenfors, as understood by Applicants, is directed to a C-arm type x-ray examination positioner. The C-arm apparatus of Stenfors is cited by the Office Action as purportedly

supporting the capability of scanning of a patient laterally. The Office Action alleged that it would have been obvious to combine the teachings of Negrelli and Stenfors.

Applicants maintain that even if it would have been obvious to combine the teachings of Negrelli and Stenfors, which Applicants do not concede, the combination would not render the claimed invention obvious. As pointed out on page 7 of the Office Action, Negrelli teaches that the Negrelli system mimics many of the C-arm protocols virtually (i.e. by software processing and manipulation of the electrical signals), and does not require any mechanical adaptation. In essence, it is the position of the Office Action that a system according to the combination of Negrelli and Stenfors can achieve the same functionality as the claimed invention, and therefore is equivalent to the claimed invention.

However, whether the prior art is equivalent to the claimed invention is not the test of obviousness under 35 U.S.C. §103(a).

As acknowledged in the Office Action, there is no need to make any mechanical modifications to the system of Negrelli which can be modified virtually to achieve the functionality taught by Stenfors. Thus, it would not have been obvious to one skilled in the art with the benefit of Negrelli and Stenfors to modify the system of Negrelli to include an upwardly extending, floor-supported column which supports the receptor for movement to different positions up and down along an upwardly extending axis, about the same or a different upwardly extending axis, as provided by the claimed invention described in claim 1.

Narita was cited in the Office Action, in connection with claim 6, as purportedly disclosing a computer which utilizes information from encoders to control motors. However, Narita does not cure the deficiencies of Negrelli and Stenfors. The cited art simply does not disclose or suggest the claimed invention of claim 1.

For at least the above-stated reasons, Applicants respectfully submit that independent claim 1 and the claims (4-7) depending therefrom are patentable over the cited references.

Independent claim 2 is directed to a system positioning a digital flat panel x-ray receptor for a variety of diagnostic x-ray protocols. The system comprises an x-ray source, a digital flat panel x-ray receptor, a first track supporting, for movement along the first track, a first downwardly extending, telescoping column, a second track supporting, for movement along the second track, and a second, downwardly extending, telescoping column. The first telescoping column supports the x-ray source for movement up and down, about a first up-down axis, and about a first lateral axis transverse to the first up-down axis, to thereby position and orient an x-ray beam from the x-ray source for a variety of x-ray imaging protocols. The second telescoping column supports the receptor for movement up and down, about a second up-down axis, and about a second lateral axis transverse to the second up-down axis, to thereby position and orient an imaging face of the receptor to match the position and orientation of the x-ray beam for the variety of x-ray imaging protocols. The variety of x-ray imaging protocols is for standing, sitting and recumbent patients.

Independent claim 3 is directed to a system positioning a digital flat panel x-ray receptor for a variety of diagnostic x-ray protocols. The system comprises an x-ray source, a supporting structure for the x-ray source, a digital flat panel x-ray receptor, a track supporting, for movement along the track, and a downwardly extending, telescoping column. The x-ray source selectively emits an x-ray beam and positions the beam at positions and orientations for a variety of x-ray imaging protocols. The digital flat panel x-ray receptor has an imaging face. The telescoping column supports the receptor for movement up and down, about an up-down axis, and about a lateral axis transverse to the up-down axis, to thereby position and orient the imaging face of the

receptor to match the position and orientation of the x-ray beam for the variety of x-ray imaging protocols. The variety of x-ray imaging protocols is for standing, sitting and recumbent patients.

Hauck, as understood by Applicants, is directed to an apparatus for coupling independently suspended x-ray source and detector for lateral fluoroscopic studies, such as angiography. Applicants do not find a teaching or suggestion in Hauck to adapt the system of Hauck for x-ray imaging protocols for standing and sitting patients.

Roos, as understood by Applicants, is directed to a fluoroscopic diagnostic imaging device which includes a gantry for supporting an x-ray tube and a flat plate x-ray detector. According to the Office Action, Roos is merely cited for its disclosure of a digital flat panel. Applicants find no teaching or suggestion in Roos to adapt an imaging system or device for x-ray imaging protocols for standing and sitting patients.

Accordingly, Applicants maintain that the claimed invention of claims 2 and 3 simply would not have been obvious to one of ordinary skill in the art based on the teachings of Hauck and Roos, unless the claims are impermissibly used as a roadmap for reconstructing the claimed invention.

According to the Office Action, claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Office Action states that the prior art fails to teach or fairly suggest a flat panel x-ray receptor that moves in at least two translational and three rotational degrees of motions.

New independent claims 10 and 13 include this feature, and for this and other reasons are believed to be patentable.

If a petition for an additional extension of time is required to make this response timely,

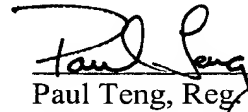
this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

The Office is hereby authorized to charge the \$172.00 fee for the two additional claims, as well as any additional fees that may be required in connection with this response, and to credit any overpayment, to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,



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